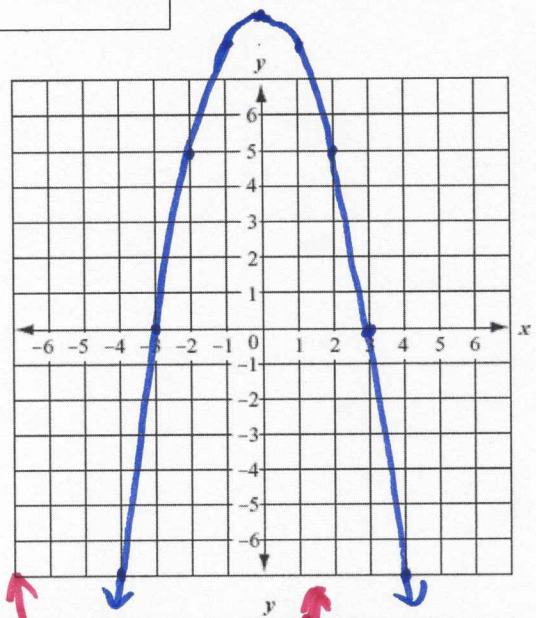
Michael T. Davis Pre-Calculus	Units 1.5 & 1.6 Practice Quiz September 27, 2016

Name: Solution Key

1. Graph the parabola with quadratic equation $f(x)=9-x^2$

$V(0,9)$



2. Graph the parabola with quadratic equation $f(x)=x^2+6x$

$0 = x(x+6)$

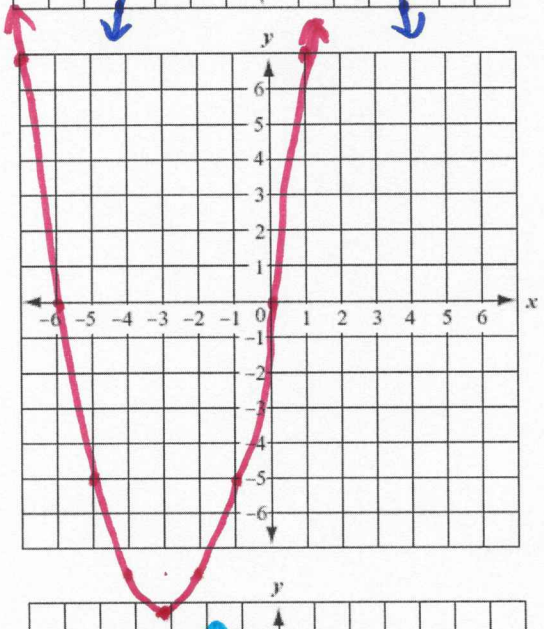
$x=0 \quad x=-6$

$(0,0) \quad (-6,0)$

axis $x=-3$

$f(-3) = (-3)^2+6(-3) = 9-18 = -9$

$V(-3,-9)$



3. Graph the parabola with quadratic equation
$f(x)=2(x+1)(x-3)$

$0 = 2(x+1)(x-3)$

$x=-1 \quad x=3$

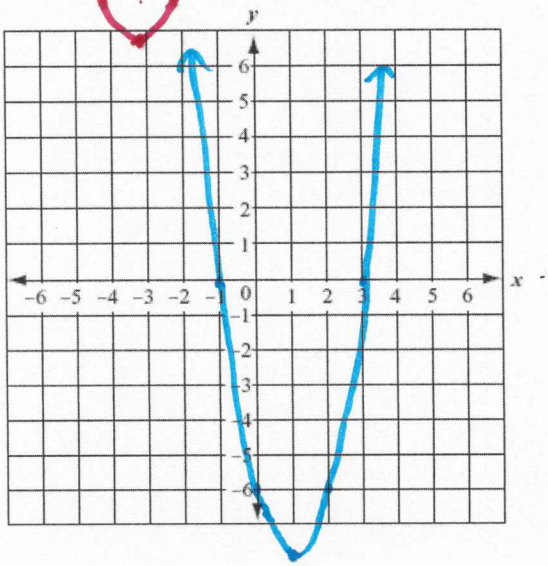
$(-1,0) \quad (3,0)$

axis $x=1$

$f(1) = 2(1+1)(1-3)$

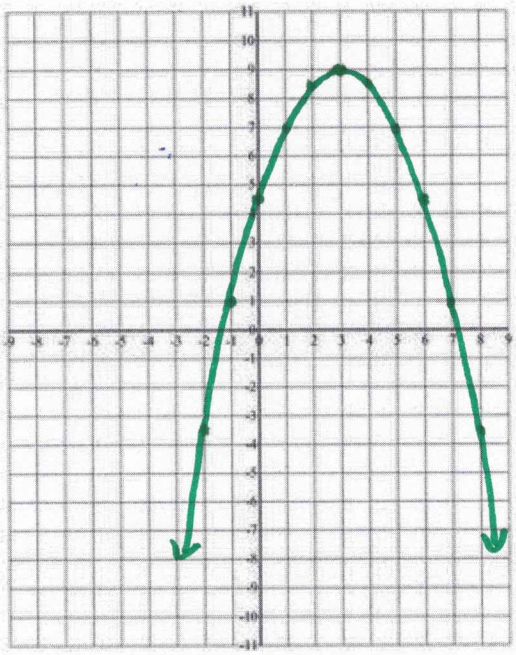
$= (-8)$

$V(1,-8)$



4. Graph the parabola with quadratic equation $f(x)=\frac{-1}{2}(x-3)^2+9$

$V(3,9)$

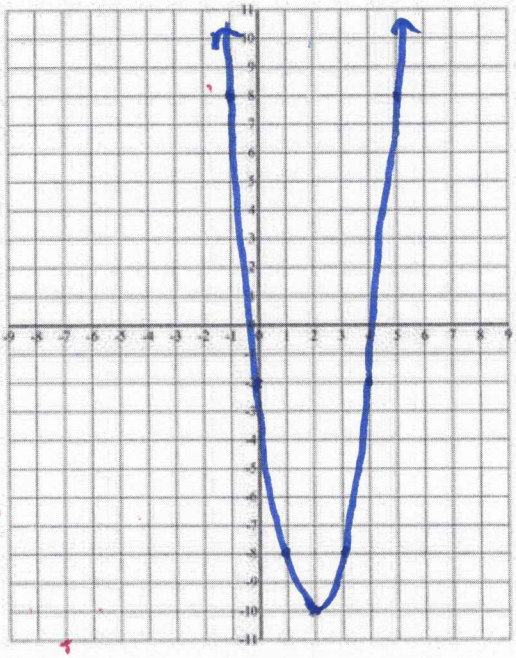


5. Graph the parabola with quadratic equation $f(x)=2x^2-8x-2$

$x=\frac{-(-8)}{2(2)}=\frac{8}{4}=2$

$f(2)=2(2)^2-8(2)-2=8-16-2=-10$

$V(2,-10)$



6. Convert the quadratic equation $f(x)=x^2-6x-2$ to vertex form

$f(x)=1(x^2-6x+9)-2-9$

$f(x)=(x-3)^2-11$

$V(3,-11)$

7. Convert the quadratic equation $f(x)=2x^2+8x+1$ to vertex form

$f(x)=2(x^2+4x+16)+1-32$

$f(x)=2(x+4)^2-31$ $V(-4,-31)$

8. Convert the quadratic function $f(x)=\frac{1}{2}(x+4)^2+3$ to standard form

$f(x)=\frac{1}{2}(x+4)(x+4)+3$

$=\frac{1}{2}(x^2+4x+4x+16)+3$

$=\frac{1}{2}(x^2+8x+16)+3$

$=\frac{1}{2}x^2+4x+8+3$

$f(x)=\frac{1}{2}x^2+4x+11$

9. Convert the quadratic function $f(x)=2x^2+5x-12$ to factored form

$f(x)=(2x-3)(x+4)$

10. Without graphing the entire parabola, determine the number of x-intercepts of the parabola with equation $f(x)=-3(x+1)^2-2$. If there are real zeros, then find them.

$V(-1,-2)$

No real zeros since no real x-intercepts

11. Without graphing the entire parabola, determine the number of x-intercepts of the parabola with equation $f(x)=\frac{1}{4}(x+3)^2-1$. If there are real zeros, then find them.

$0=\frac{1}{4}(x+3)^2-1$

$1=\frac{1}{4}(x+3)^2$

$4=(x+3)^2$

$\pm\sqrt{4}=\sqrt{(x+3)^2}$

$\pm 2=x+3$

$-3\pm 2=x$

$x=-3+2=-1$

$x=-3-2=-5$

$\{-5,-1\}$

12. For the parabola shown, write the equation of the quadratic function in all three forms.

two forms

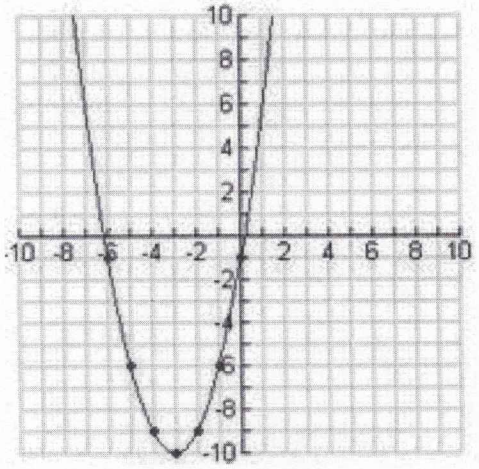
$V(-3,-10)$

$f(x)=(x+3)^2-10$ ✓

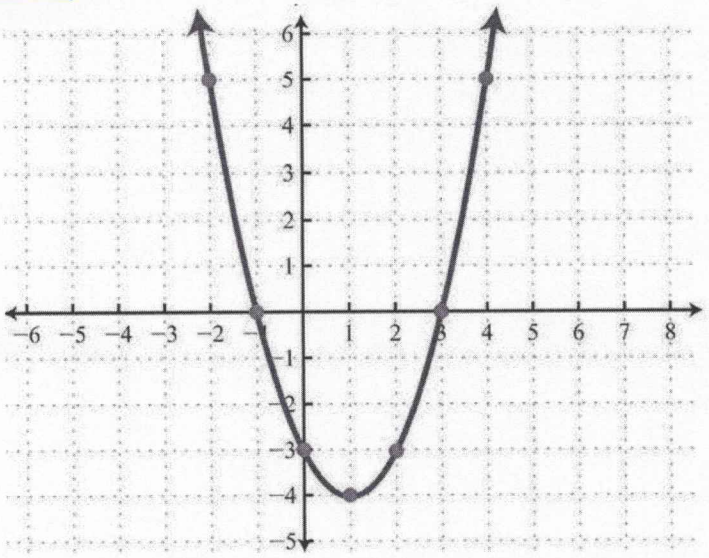
$f(x)=(x+3)(x+3)-10$

$f(x)=x^2+6x+9-10$

$f(x)=x^2+6x-1$ ✓



13. For the parabola shown, write all three equation forms of the quadratic function.



$V(1,-4)$ $f(x) = (x-1)^2 - 4$ ✓

$f(x) = (x-1)(x-1) - 4$

$f(x) = x^2 - 2x + 1 - 4$

$f(x) = x^2 - 2x - 3$ ✓

$f(x) = (x-3)(x+1)$ ✓

14. Determine the zeros of the quadratic function $f(x) = (3x-2)(x+4)$

$0 = (3x-2)(x+4)$ zeros are $x = \frac{2}{3}$ and $x = -4$

$\left\{\frac{2}{3}, -4\right\}$

15. Determine the zeros of the quadratic function $f(x) = 2(x+1)^2 - 8$

$0 = 2(x+1)^2 - 8$

$8 = 2(x+1)^2$

$4 = (x+1)^2$

$\pm\sqrt{4} = \sqrt{(x+1)^2}$

$\pm 2 = x+1$

$x = -1 \pm 2$

$x = -1 - 2 = -3$

$x = -1 + 2 = 1$

$\{-3, 1\}$

16. Determine the zeros of the quadratic function $f(x) = x^2 - 5x$

$0 = x(x-5)$

$x = 0$ $x = 5$

$\{0, 5\}$

17. Determine the zeros of the quadratic function $f(x)=x^2-5x-24$

$0=(x-8)(x+3)$

$x=8 \quad x=-3 \qquad \{8,-3\}$

18. Determine the equation for the axis of symmetry of the parabola defined by the quadratic function $f(x)=(3x-2)(x+4)$

$x=\frac{2}{3} \quad x=-4$

midpoint of $x=\frac{2}{3}$ and $x=-4$ is $x=\frac{\frac{2}{3}+-4}{2}=-3\frac{1}{3}\div 2=\frac{-10}{3}\div 2=\frac{-5}{3}$

$f(\frac{-5}{3})=(3(\frac{-5}{3})-2)(-\frac{5}{3}+4)$

$=(-5-2)(1\frac{2}{3})$

$=(-7)(\frac{5}{3})=\frac{-35}{3}=-11\frac{2}{3}$

Vertex $(-\frac{5}{3},-11\frac{2}{3})$

axis $x=\frac{-5}{3}$

19. Determine the coordinates of the vertex of the parabola defined by the quadratic function $f(x)=2(x+1)^2-5$

$V(-1,-5)$

20. Determine the coordinates of the vertex of the parabola defined by the quadratic function $f(x)=-3x^2+12x-5$

$x=\frac{-12}{2(-3)}=\frac{-12}{-6}=2$

$f(2)=-3(2)^2+12(2)-5$

$=-3(4)+24-5$

$=-12+24-5$

$=12-5$

$=7$

$V(2,7)$

21. Determine the coordinates of the vertex of the parabola defined by the quadratic function $f(x)=x^2-4x-32$

$x=\frac{-4}{2(1)}=\frac{4}{2}=2$

$f(2)=2^2-4(2)-32$

$=4-8-32$

$=-4-32$

$=-36$

$V(2,-36)$

22. Without graphing, determine the number of real zeros (x-intercepts) of the parabola with equation $g(x)=\frac{1}{2}(x+1)^2-8$. Then, find the real zeros

$0=\frac{1}{2}(x+1)^2-8$

$8=\frac{1}{2}(x+1)^2$

$16=(x+1)^2$

$\pm\sqrt{16}=\sqrt{(x+1)^2}$

$\pm 4=x+1$

$-1\pm 4=x$

$\{-5, 3\}$

23. Determine the real zeros (x-intercepts) of the parabola with equation $f(x)=-2x(3x-1)$, i.e. solve

$0=-2x(3x-1)$

$x=0$ $\quad 3x-1=0$

$3x=1$

$x=\frac{1}{3}$

$\{0, \frac{1}{3}\}$

24. Determine the real zeros (x-intercepts) of the parabola with equation $f(x)=2x^2-10x$, i.e. solve $0=2x^2-10x$

$0=2x^2-10x$

$0=2x(x-5)$

$x=0$ $\quad x=5$

$\{0, 5\}$

25. Determine the real zeros (x-intercepts) of the parabola with equation $f(x)=x^2-2x-35$, i.e. solve

$0=x^2-3x-40$

$0=x^2-2x-35$

$0=(x-7)(x+5)$

$x=7$ $\quad x=-5$

$\{7, -5\}$

26. Determine the real zeros (x-intercepts) of the parabola with equation $f(x)=x^2+6x-3$, i.e. solve

$0=x^2+6x-3$

DNF

$x=\frac{-6\pm\sqrt{6^2-4(1)(-3)}}{2(1)}$

$x=\frac{-6\pm\sqrt{36+12}}{2}$

$x=\frac{-6\pm\sqrt{48}}{2}$

$x=\frac{-6\pm\sqrt{16\cdot 3}}{2}$

$x=\frac{-6\pm 4\sqrt{3}}{2}$

$x=-3\pm 2\sqrt{3}$

$\{-3+2\sqrt{3}, -3-2\sqrt{3}\}$